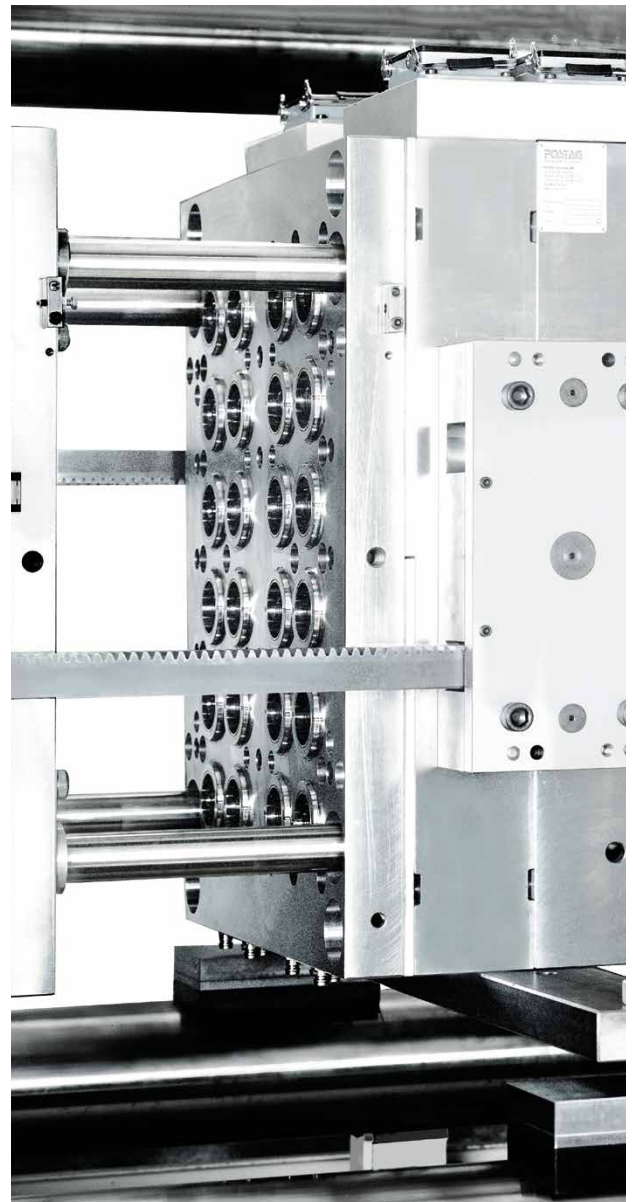# Corroplast®
The ultimate stainless steel
for all stainless plastic moulds

Swiss Steel Group

„All stainless"- mould construction

The current trend in plastic mould manufacturing is towards the use of moulds using all stainless steel.

This is partly due to the steel's resistance to condensation and cooling water, as well as the increasing use of corrosive plastics such as PVC or aminoplasts. Such materials corrode tool steel through the separation of acids during processing.

The benefits producers of plastic components obtain by the enhanced utilization of all stainless mould bases at the same time have constituted a disadvantage for mould constructors, on account of the considerable to extreme machining effort necessary to produce all stainless steel grades available to date.

With mould frames in particular, where a machining volume of 60% is not rare, easy machinability and shape retention have therefore become the most important criteria.

As a result Deutsche Edelstahlwerke, in cooperation with several tool specialists, developed the unique special steel Corroplast®, which is characterised by unparalleled machinability.

Corroplast®

No other stainless steel machines more easily.

Corroplast® is the most excellent mould frame steel on the market and is machined more easily than any other stainless steel. The outstandingly good machinable tool steel Corroplast® is an innovation based on knowledge gained from experience with steel grade 1.2085.

Corroplast® necessitates less machining effort than any other stainless steel for plastic moulding known to date.

Corroplast® is characterised by extremely low internal stress – due to a specific technology applied at production – and is of utmost dimensional stability.

Corroplast® does not require any additional heat treatment, inasmuch as it is delivered at a standard hardness of approx. 320 HB.

Corroplast® needs no electroplating to increase its corrosion resistance. This makes it a high-quality alternative to the previously customary mould frame steels like grade 1.2312, which necessitated additional anticorrosion measures. These not only means shorter production times, but also lower production costs for the mould constructor.

Corroplast® exhibits improved weldability, which is attained by the reduction of the carbon content.

Corroplast® can also be utilised for mould inserts – provided that standard demands on the engraved surface are applied. In this way the mould constructor only needs one material for frame and insert.

The profitability of plastic production is dictated by the efficiency, reliability and quality of the steel used for the mould. On account of the superior advantages of Corroplast® plastics manufacturers using the steel achieve a noticeable increase in cost effectiveness, productivity and quality.

Comparison of properties

	Corroplast®	1.2085
Machinability	+++	+
Corrosion resistance	++	+
Thermal conductivity	++	+
Toughness	+	O
Weldability	++	O
Polishability	+	+
Shape retention	+++	+

Benefits for the plastics processor.

The core operational areas of Corroplast® are base plates, mould bases and plastic moulds, with standard requirements on polishability and resistance to condensation and cooling water. Corroplast® is in a position to substantiate its strengths emanating from low-level mould maintenance needs which in turn are to the advantage of the manufacturers of plastic components:

– Necessary maintenance and cleaning activities are reduced to a minimum, especially in demanding climatic conditions such as high humidity or sea air with a high salt content

– There is no risk of contact corrosion between mould frame and insert when using similar stainless materials

– Water flow and heat dissipation are not impeded by substances resulting from corrosion in the cooling channels

– The substantially improved thermal conductivity facilitates shorter cycle times

Machinability in % (hardness 325 HB)

Roughing	**1.2085** 100% **Corroplast®** 140%	
Finishing milling	**1.2085** 100% **Corroplast®** 135%	
Grinding	**1.2085** 100% **Corroplast®** 135%	
Drilling	**1.2085** 100% **Corroplast®** 150%	
Thread cutting	**1.2085** 100% **Corroplast®** 140%	

Machining values for Corroplast® (hardness 290 - 332 HB)

Tool	Level milling Ø 25	Edge milling Ø 120	Round plate Ø 66	Drilling
Cutting material	K 15	P 40 coated	P 40 coated	Solide carbide
Cutting speed v_c in m/min	80	140	140	60
Feed per tooth f_z in mm	0.3	0.7	0.6	0.2
Depth of cut a_p in mm	5.0	2.0	2.0	55.0
Width of cut a_e in mm	15.0	100.0	45.0	17.5
Stability of the machine, clamping + workpiece	+++	+++	+++	+++

Chemical composition in weight-%

C	Mn	S	Cr	Additions
0.05	1.30	0.15	12.50	+

Special properties

Corroplast® is a corrosion-resistant steel for plastic moulding, featuring extremely good machinability at a supplied hardness of approx. 320 HB. The reduced carbon content endows Corroplast® with excellent welding properties.

Applications

Base plates, mould frames, mould bases and plastic moulds with low requirements on polishability, as well as being resistant to condensation and cooling water.

Mechanical properties

The following table summarizes the mechanical properties of the Corroplast® in as-delivered condition.

Heat treatment diameter in mm	170
Yield strength $R_{p0,2}$ in MPa	≥ 890
Tensile strength R_m in MPa	1100
Elongation A in %	≥ 13
Reduction of area Z in %	≥ 42

Physical properties

Density in kg/dm³	7.7

Coefficient of thermal expansion in 10^{-6}/K	
20 - 100 °C	10.3
20 - 150 °C	10.6
20 - 200 °C	10.9
20 - 250 °C	11.1
20 - 300 °C	11.2
20 - 350 °C	11.4
20 - 400 °C	11.6
20 - 450 °C	11.8
20 - 500 °C	12.0

Thermal conductivity in W/(mK)	
23 °C	24.6
150 °C	25.7
300 °C	25.8
350 °C	25.7
400 °C	25.4
500 °C	24.7

Young's modulus in GPa	
20 °C	214.6
150 °C	208.6
350 °C	198.0

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info.tool@swisssteelgroup.com

www.swisssteel-group.com

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